Bloom's Levels of Thinking

Evaluation

Ability to judge value of material for given purpose based on specific criteria

Synthesis

Ability to put parts together to form a new whole; may involve production of communication, plan of operation or set of abstract relationships

Analysis

Ability to break down material into component part to understand organizational structure

Application

Ability to use learned material in new and concrete situations; applied learning

Comprehension

Ability to grasp meaning of material evidenced by translation of one form to another (words to numbers) or interpreting material (explaining or summarizing)

Knowledge

Ability to remember previously learned material
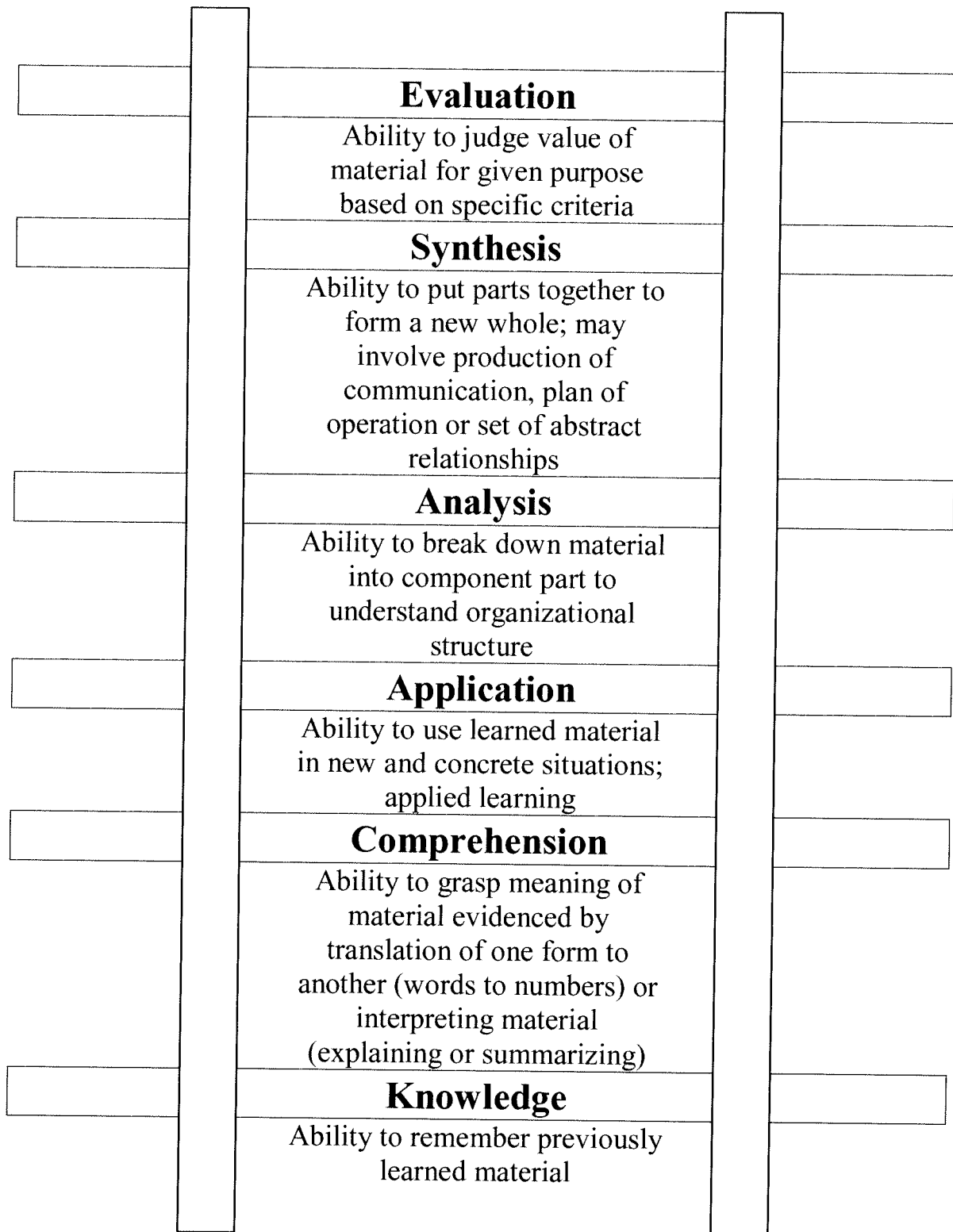
Dissecting Standards to Build Instruction

Grade/Course: _____

School: _____

Standard:

7.M.1.2.4 Evaluate numerical expressions using the order of operations with whole numbers and decimals

Student Friendly Language:

Solve a math problem with whole numbers and decimals correctly using the order of operations.

What are the prerequisite skills?	What vocabulary is required for knowledge and understanding? (Include specific examples- content and academic)
Addition Subtraction Multiplication Division **All with whole numbers and decimals Knowledge of order of operations	**Academic** Evaluate Solve Simply **Content** Numerical expression Order of operations PEMDAS

What measure(s) will you use to know that students mastered this standard? (How are you informed of student progress on a daily basis? How is this knowledge/skill/concept assessed on state/district assessments?)

Students can obtain the correct numeric answer by doing the correct computations.
Use student whiteboards to show steps as below:

$6 + 3 \cdot (10/2)$
$6 + 3 \cdot 5$
$6 + 15$
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Assessed by actual computations:

Focus Question: How do we use order of operations to solve expressions?

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(Sample items for the purpose of assessing item validity- are these effective or not?)

$40 - 10 / 5 \cdot 6$ $(5 - 7) \cdot (55 - 11)$ $k \cdot (5 + 4) + 16$

$5 + 4^2 / (6 - 6/3)$ $4(3+n) - 2$ if $n=2$
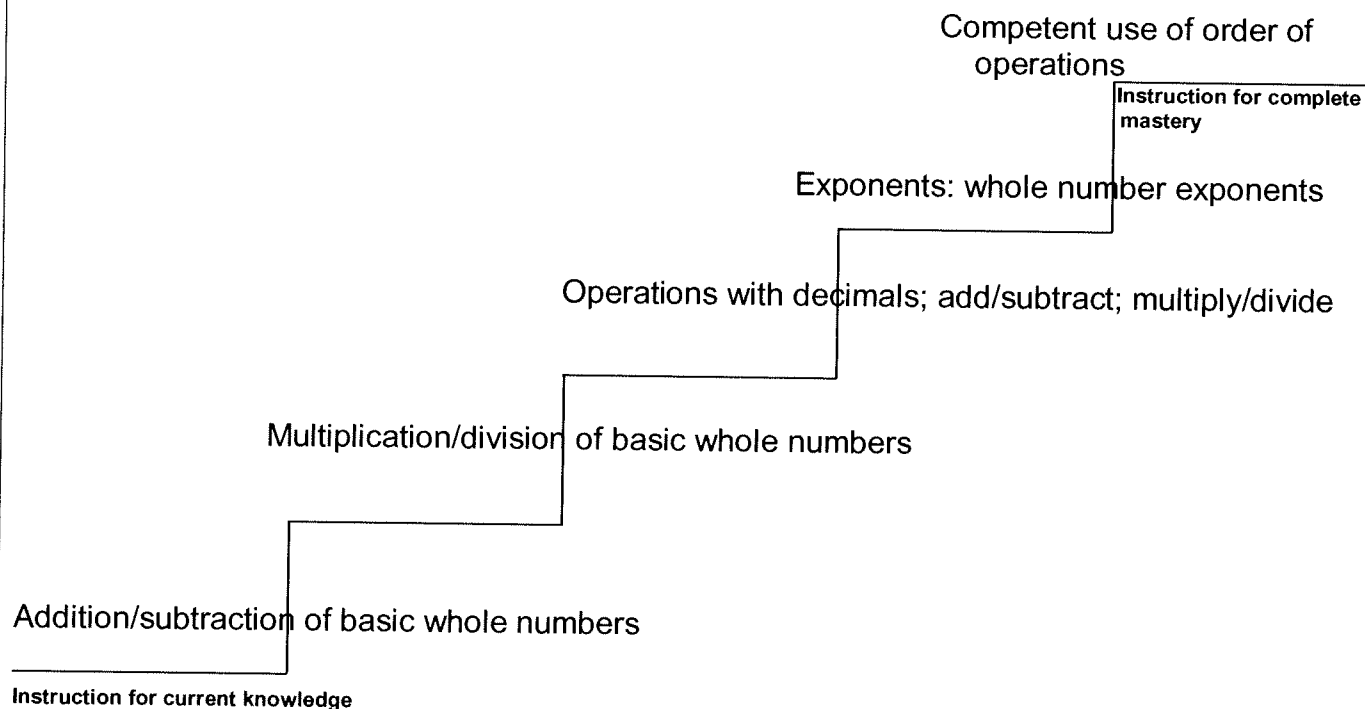
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What are student roadblocks to achieving mastery of this standard? (misconceptions, common errors, stumbling blocks, etc.)
Many confuse the proper order of operations. Many students are taught in earlier grades that the order is P E M D A S instead of P E M/D (left to right) and A/S (left to right)

What are the layers of instruction that are required to get students to mastery?

Competent use of order of operations

Instruction for complete mastery

Exponents: whole number exponents

Operations with decimals; add/subtract; multiply/divide

Multiplication/division of basic whole numbers

Addition/subtraction of basic whole numbers

Instruction for current knowledge

Plans for differentiated instruction

Students write down each layer of order of operation as it is completed, or underline the portion they are working on

Stay with less complex problems like 6 + 3 • (10/2) then once success is established move to more complex: $5 + 2^4/4 + 7 • 2$

Start small with just multiply/divide and add/subtract so they understand the left to right concept